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THE GENUS *STRIGA* LOUR. IN WESTERN INDIA

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ABSTRACT

The nomenclature of the *Strigae* is unsatisfactory. The name *Striga asiatica* has been a source of confusion as the original description is ambiguous and the Linnaean plant material is a mixture of several species. This name comes under purview of Art. 69 of the Code and has, therefore, been rejected.

A study of the type material and of the original description of *Buchnera euphrasioides* Vahl indicate that it is quite distinct from *Striga euphrasioides* Benth. According to Art. 55 of the Code the name *Striga euphrasioides* (Vahl) Benth. has to be restricted to Vahl's plant. The plant commonly called *Striga euphrasioides* Benth. has been renamed as *Striga angustifolia* (Don) comb. nov.

The third part of the paper gives a dichotomous key, the nomenclature of and distributional notes to the 5 species of *Striga* occurring in the wet, western part of peninsular India.

The genus *Striga* Lour. belonging to the family Scrophulariaceae, has received a good deal of attention in recent years especially with regard to its physiology and control. Unfortunately, the nomenclature of the group is confusing and adversely effects research carried on in other branches of Botany and Agriculture. We hope to throw some light on the taxonomy of this genus.

In this paper, we shall first show that the name *Striga asiatica* (L.) O. Kuntze has to be rejected. Next, we shall propose a new name for the plant usually called *S. euphrasioides* Benth. In the third part we shall present a systematic study of the genus as represented in the wet part of peninsular Western India.

Linnaeus described a plant called *Buchnera asiatica* in Sp. Pl. 630, 1753. His description runs as follows: 'Buchnera (asiatica) foliis integerrimis alternis. Habitat in Zeylona, China. Caulis ramis alternis, habitu Euphrasiae, obtuse tetragonus. Folia lineari-lanceolata, scabra, integerrima, alterna versus basin opposita. Spicae longae floribus alternis remotis. Calyces quinquepartiti, scabri: Tubus corollae filiformis, calyce duplo longior, cervice incurvato, stamina 4 includente; Limbus quinquefidus, purpureus; laciniis 2 superioribus brevissimis reflexis; tribus reliquis obovatis subaequalibus.'

This diagnosis is as ambiguous as it can be, and has been applied to different species. Linnaeus did not mention any specimen or figure that could be considered a type. The material in the Linnaean herbarium, indentified in part by Linnaeus himself, includes more than one species. Bentham studied these specimens and observed in Hook. Comp. Bot. Mag. 1: 364, 1836, 'I find from his (Linnaeus') herbarium that he applied that name (*Buchnera asiatica*) to all the *Strigae* he was acquainted with'. Subsequently, in his revision of this genus in DC. Prodr. 10: 502-503, 1846, Bentham cited *Buchnera asiatica* L. *ex parte* as a synonym under 4 different species of *Striga*, i.e. *densiflora, euphrasioides, hirsuta* and *thunbergii.*

The Linnaean binomial was recombined as *Striga asiatica* (L.) O. Kuntze, Rev. Gen. Pl. 2: 466, 1891. Hochreutiner holds that this combination applies to *S. densiflora* Benth. He observes in Candollea 5: 210, 1934, 'Linné semble avoir effectivement confondu les *S. densiflora* et *lutea* et O. Kuntze a pu reprendre avec raison le nom linnéen de *asiatica* pour le *S. densiflora* Benth.'

It would seem, from the passage just cited, that *S. asiatica* (L.) O. Kuntze should denote *S. densiflora* Benth. Merrill, however, is of quite a different opinion. As he sees it, Linnaeus' description refers to *S. lutea* Lour. Merrill writes in Trans. Am. Phil. Soc. 24(2): 353, 1935, '*Buchnera asiatica* Linn. was based on actual specimens from China and Ceylon, Bentham stating that the material in the Linnaean herbarium is in part *S. hirsuta* Benth. and in part *S. densiflora* Benth. Linnaeus' description applies to the former, i.e. the form described by Loureiro as *S. lutea.*' For Merrill, then, *S. asiatica* (L.) O. Kuntze refers to *S. lutea* Lour.

Pennell has taken up a third position. In Acad. Nat. Sc. Phil. Mon. 5: 96, 1943 he remarks, 'I think that the description (Linnaeus') of the stem as obtusely tetragonous, of the leaves as linear-lanceolate and scabrous, and of the corolla-limb as purple, best denotes the species now considered, the plant that Bentham called *S. euphrasioides.*' According to Pennell, therefore, *S. asiatica* (L.) O. Kuntze is the correct name for *S. euphrasioides* Benth.

The fundamental cause of all this confusion is the imprecise nature of the Linnaean description and the lack of an authentic type. Any attempt to decide on a *lectotype* is bound to be arbitrary and open to question. Under these circumstances, *Striga asiatica* (L.) O. Kuntze certainly comes under the purview of Art. 69 of the Code which states, 'A name must be rejected if it is used in different senses and so has become a long-persistent source of error.' In accordance with this ruling and to avoid further confusion, we consider *S. asiatica* (L.) O. Kuntze as well as its basionym, *nomina rejicienda.*

The various plants that have been called *Striga asiatica* (L.) O. Kuntze have to be named according to the rules of priority. As for the 4 species mentioned by Bentham, *S. hirsuta* Benth. (1846) becomes a synonym of *S. lutea* Lour. (1790); *S. densiflora* Benth. seems to be a valid name; *S. euphrasioides* (Vahl) Benth. is valid, but, as will be demonstrated presently, refers to a plant different from the one mentioned by Bentham; *S. thunbergii* Benth., based on *Buchnera bilabiata* Thunb. Prodr. Fl. Cap. 100, 1794, becomes a synonym of *Striga bilabiata* (Thunb.) O. Kuntze, Rev. Gen. Pl. 3(2): 240, 1898.

Our second task is to show that the plant usually called *S. euphrasioides* Benth. has to be renamed. Bentham in Hook. Comp. Bot. Mag. 1: 364, 1836 and in DC. Prodr. 10: 503, 1846, described a plant with elongated leaves, long striated, sub-15-ribbed calyces and pubescent corollae. He cited *Buchnera euphrasioides* Vahl as the basionym of his plant.

We have been able to study Vahl's type material through photographs kindly sent us by Dr. Skovsted of the Botanical Museum of the University in Copenhagen. *Buchnera euphrasioides* Vahl has short leaves, a non-elongated calyx and a villous corolla. Dr. Skovsted has examined the calyces of *B. euphrasioides* Vahl and has found them to be 5-ribbed.

Consequently, Vahl and Bentham are referring to quite distinct plants even though they are using the same specific epithet *euphrasioides*. The name *Striga euphrasioides* (Vahl) Benth. must, according to Art. 55 of the Code, be restricted to the plant described by Vahl.

The plant usually called *S. euphrasioides* by authors of Indian floristic works has to be renamed. It so happens that *Buchnera asiatica* Vahl is none other than the plant called *S. euphrasioides* Benth. Photographs of Vahl's type clearly show a 15-ribbed calyx and exserted corolla. *B. asiatica* Vahl is a common plant in Western India and has to be transferred to the genus *Striga*. However, it cannot be called *S. asiatica* as this would be a later homonym ruled out by Art. 64 of the Code. According to the provisions of Art. 72 we have to take up the oldest available legitimate epithet and use it in a new combination. This epithet is available to us in *Buchnera angustifolia* Don, Prodr. Fl. Nep. 91, 1825. We, therefore, recombine it as *Striga angustifolia* (Don) comb. nov.

Coming to the classification of the genus, we shall give a dichotomous key followed by the nomenclature and distribution of the 5 species occurring in the wet, western part of peninsular India.

Experience has shown us that it is quite misleading to insist merely on the number of the calyx-ribs in delimiting the species. *Striga lutea* Lour., which is usually said to have 10 ribs, has been found to have as many as 17. Similarly, *S. gesnerioides* (Willd.) Vatke may have 4-8 ribs depending on the number of properly developed calyx-lobes. More importance should be given to the position of these ribs than to their mere number.

KEY TO THE SPECIES

A	Calyx-ribs as many as number of normal lobes	
B	Stems usually purple; leaves reduced to scales	1. *gesnerioides*
BB	Stems green; leaves not reduced to scales	2. *densiflora*
AA	Calyx-ribs more than the number of normal lobes	
C	One calyx-rib terminating at the tip of each lobe; the rest terminating in the sinuses	3. *lutea*
CC	Three calyx-ribs terminating at the tip of each lobe	
D	Flowers white; corolla exserted	4. *angustifolia*
DD	Flowers yellow; corolla usually included	5. *sulphurea*

1. **Striga gesnerioides** (Willd.) Vatke in Oest. Bot. Zeitschr. 25: 11, 1875; Pennell in Acad. Nat. Sc. Phil. Mon. 5: 97, 1943; Santapau in Journ. Bomb. nat. Hist. Soc. 49: 42, 1950 (*S. gesnerioides*).

Buchnera gesnerioides Willd. Sp. Pl. 3: 338, 1800.

B. hydrabadensis Roth, Nov. Pl. Sp. 292, 1821.

B. orobanchioides R. Br. in Salt, Abyss. App. 64, 1814, *nom. nud.* & ex Endl. in Bot. Zeit. 2: 388, t. 2, 1832; Benth. Scroph. Ind. 40, 1835.

Striga orobanchioides (R. Br. ex Endl.) Benth. in Hook. Comp. Bot. Mag. 1: 361, t. 19, 1836; Dalz. & Gibs. Bomb. Fl. 181, 1861; Hook. f. in Fl. Brit. Ind. 4: 299, 1884; Cooke, Fl. Bomb. 2: 302, 1905; Van Buren in Poona Agric. Coll. Mag. 5: 284, t. 3, 1914 (*S. orobanchoides*); Gamble, Fl. Madr. 967, 1924; Barnes in Journ. Ind. Bot. Soc. 15: 126, f. 1, 1936.

var. **gesnerioides.** Mature stems up to 40 cm. Flower tube up to 1 cm; limb more than 5 mm in diam. Parasitic on roots of *Lepidagathis*, *Euphorbia* and *Dysophylla* spp.

Type in the Willdenow Herbarium of the Botanischer Museum, Berlin-Dahlem.

Occurrence: Fairly common throughout Western India.

BOMBAY: Bandra, *D'Almeida* 958(2)! DANGS: Pimpri, *Santapau* 20223! KOLABA: Matheran, *Irani* 2943! 4659! 5523!; NORTH KANARA: Castlerock, *Bell* 4339!; Mirjan, *Hallberg* & *McCann* 34177! POONA: Khandala, *Santapau* 5487! 9507! RATNAGIRI: Ratnagiri, *Saldanha* 7138! SATARA: Mahabaleshwar, *Acland* 821! Bole 403! *Santapau* 22862! THANA: Tungar, *Santapau* 145.7!

var. **minor** Santapau in Kew Bull. 1948: 491, 1949 & in Journ. Bomb. nat. Hist. Soc. 49: 43, 1950 & in Rec. bot. Surv. India. 16(1): 206, 1953.
Stem very reduced, 1.8–8.5 cm tall. Flowers small, at most 2.5–3.5 mm in diam. Parasitic on roots of *Hygrophila serpyllum* Anders.
Type *Santapau* 3072! in the Blatter Herbarium, St. Xavier's College, Bombay.
Occurrence: Fairly common around Bombay. KOLABA: Matheran, *Irani* 4756! POONA: Khandala, *Saldanha* 1944! 6540! *Santapau* 5051! THANA: Mumbra, *Kapadia* 276! *Santapau* 21579! *Shenoy* 1538!

2. **Striga densiflora** (Benth.) Benth. in Hook. Comp. Bot. Mag. 1: 363, 1863 & in DC. Prodr. 10:502, 1846; Hook. f. in Fl. Brit. Ind. 4:299, 1884; Cooke, Fl. Bomb. 2:303, 1905; van Buren in Poona Agric. Coll. Mag. 5: 282, 1914; Gamble, Fl. Madr. 967, 1924; Barnes in Journ. Ind. Bot. Soc. 15:126 & 129, 1936; Pennell in Acad. Nat. Sc. Phil. Mon. 5:97, 1943; Santapau in Journ. Bomb. nat. Hist. Soc. 49:43, 1950.
Buchnera asiatica L. Sp. Pl. 630, 1753, *pro parte, (nom. rej.)*
B. densiflora Benth. Scroph. Ind. 41, 1835.
Striga asiatica (L.) O. Kuntze, Rev. Gen. Pl. 2:466, 1891 (?); Hochreutiner in Candollea 5: 210, 1934, *(nom. rej.)*
Type in the Herbarium of the Royal Botanic Gardens, Kew!.
Occurrence: Rare on the coast but common on the upper Ghats and in the Deccan. There are 2 sheets in Kew marked 'Surat. Coll. Dalzell. 5-costatus.' and 'Concan, Stocks'. There is also a sheet in the Cooke Herb., Poona, from Khandala.
Gamble and Santapau *ll. cc.* remark that the plant is not parasitic. We have seen specimens with the haustorial connections in the Museum of the Agricultural College, Coimbatore. cf. van Buren and Barnes *ll. cc.* The plant definitely occurs as a parasite.

3. **Striga lutea** Lour. Fl. Cochinch. 22, 1790; Hook. f. in Fl. Brit. Ind. 4:299, 1884; Cooke, Fl. Bombay. 2:303, 1905; van Buren in Poona Agric. Coll. Mag. 5:195, 1914; Gamble, Fl. Madr. 968, 1924; Pennell in Acad. Nat. Sc. Phil. Mon. 5:96, 1943.
Buchnera asiatica L. Sp. Pl. 630, 1753, *pro parte, (nom. rej.)*
B. hirsuta Benth. Scroph. Ind. 41, 1835. *Striga hirsuta* (Benth.) Benth. in Hook. Comp. Bot. Mag. 1:363, 1836 & in DC. Prodr. 10:502, 1846.
S. asiatica Merrill in Trans. Am. Phil. Soc. 24(2): 353, 1935, (non O. Kuntze); Santapau in Journ. Bomb. nat. Hist. Soc. 49: 43, 1950 & in Rec. bot. Surv. Ind. 16(1): 207, 1953.

var. **lutea** Flowers yellow.
Type in the Laboratoire de Phanérogamie, Paris!.
Occurrence: A common partial root parasite. BOMBAY: Aarey, *Tavakari* 1857!; Andheri, *Santapau* 4904!; Borivli, *Randeria* 375! *Saldanha* 6561!; Malad, *Shah* 4732! CANNANORE: Payyanur, *Saldanha* 7265! CHIKMAGALUR: Charmadi Ghat, *Saldanha* 5783!; Kotegehar, *Saldanha* 6306! COORG: Mercara, *A. S. Rao* 75030! DANGS: Ahwa, *Asrana* 5364! *Santapau* 19366! KOLABA: Karjat, *Irani*, 100! KOTTAYAM: Peermade, *Saldanha* 7910! MADURAI: Kodaikanal, *Bourne* 1654! *Saldanha* 4890! NILGIRIS: Kodanad, *Sedgwick* 1555!; Ootacamund, *Saldanha* 8156! NORTH KANARA: Castlerock, *Acland* 829!; Honavar, *Saldanha* 8484!; Karwar, *Saldanha* 8357!; Kumta, *Saldanha* 8431!; Yellapur, *Sedgwick* 6545! POONA: Khandala, *Blatter* 1701! *Saldanha* 1570! *Santapau* 5416! *Sedgwick* 2593! RATNAGIRI: Amba Ghat, *Saldanha* 7175!; Katta, *Saldanha* 7069!; Malvan, *Saldanha* 7005! SHIMOGA: Agumbe, *Raghavan* 67811! *Saldanha* 6060! SOUTH KANARA: Belthangady, *Saldanha* 6447!; Belve, *Saldanha* 5952!; Sullia, *Barber* 2162! *Saldanha* 6345! THANA: Mumbra, *Shenoy* 481!; Talasari, *Saldanha* 6827!; Tansa, *Saldanha* 466!; Tungar, *Das* 1825! *Saldanha* 5766!

var. **albiflora** O. Kuntze, Rev. Gen. Pl. 2: 466, 1891.
Striga lutea Hook. f. in Fl. Brit. Ind. 4:299, 1884, *pro parte*; Cooke, Fl. Bomb. 2: 303, 1905, *pro parte*; Gamble, Fl. Madr. 968, 1924, *pro parte*.
S. asiatica var. *albiflora* Santapau in Journ. Bomb. nat. Hist. Soc. 49: 44, 1950 & in Rec. bot. Surv. Ind. 16(1): 207, 1953.
Flowers white.
Occurrence: Rare on the coast but fairly common in the Deccan.
KOLABA: Matheran, *Irani* 5487B! POONA: Khandala, *Santapau* 5202-04!

var. **coccinea** (Benth.) O. Kuntze, Rev. Gen. Pl. 2: 466, 1891.
Buchnera coccinea Benth. Scroph. Ind. 40, 1835.
Striga coccinea (Benth.) Benth. in Hook. Comp. Bot. Mag. 1:364, 1836. (non Druce 1917).
S. hirsuta (Benth.) Benth. in DC. Prodr. 10: 502, 1846, *pro parte.*
S. lutea Hook. f. in Fl. Brit. Ind. 4: 299, 1884, *pro parte*; Cooke, Fl. Bomb. 2: 303, 1905, *pro parte.*

Flowers red.
Occurrence: Rare.
KOTTAYAM: Changanacherry, *Saldanha* 7825-28!

4. **Striga angustifolia** (Don) comb. nov.

Buchnera asiatica L. Sp. Pl. 630, 1753, *pro parte* (?); Vahl, Symb. Bot. 3: 81, 1794, (*nom. rej.*)

B. angustifolia Don, Prodr. Fl. Nep. 91, 1825.

B. euphrasioides Benth. Scroph. Ind. 41, 1835 (non Vahl 1794).

Striga euphrasioides (Benth.) Benth. in Hook. Comp. Bot. Mag. 1:364, 1836 & in DC. Prodr. 10; 503, 1846; Hook. f. in Fl. Brit. Ind. 4:299, 1884; Cooke, Fl. Bomb. 2:303, 1905; van Buren in Poona Agric. Coll. Mag. 5:283, 1914; Gamble, Fl. Madr. 968, 1924; Barnes in Journ. Ind. Bot. Soc. 15:128, t. 11, 1936; Santapau, in Journ. Bomb. nat. Hist. Soc. 49: 44, 1950.

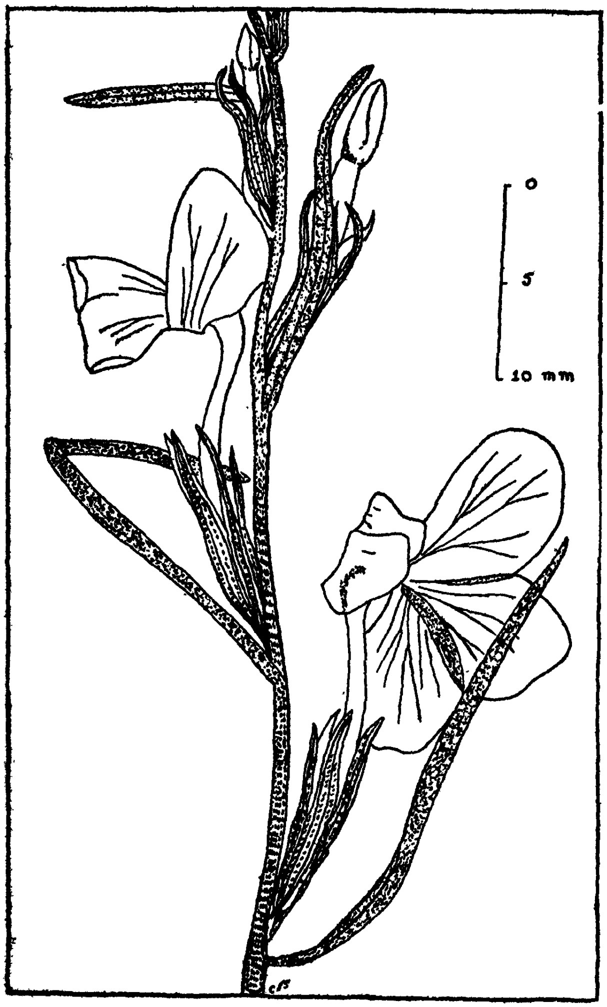

Plate 1. Detail from the type of *Buchnera asiatica* Vahl; based on photographs sent by Dr. Skovsted.

S. asiatica Pennell in Acad. Nat. Sc. Phil. Mon. 5: 96, 1943, (non all. auctt.). Type *Buchnera asiatica* Vahl, in the Botanical Museum of the University in Copenhagen. (Plate 1).

Occurrence: Common.

BOMBAY: Borivli, *Herbert* 2580!; Khar, *Vakil* 31249!; Madh Is., *Saldanha* 1372! 5739! *Shah* 7378!; Malad, *Shah* 7834! CANNANORE: Elimali, *Saldanha* 7266!; Taliparamba, *Barber* 6481! COORG: Mercara, *A. S. Rao* 74456! DANGS: Pimpri, *Asrana* 2789!; Unai, *Santapau* 17212! KANYA KUMARI: Kottaram, *Saldanha* 7703! KOLABA: Matheran, *Irani* 5626! *Saldanha* 5771A! KOZHIKODE: Kunnunmangalam, *Saldanha* 7396!; Malaparamba, *Saldanha* 7346! QUILON: Quilon, *Saldanha* 7686! SURAT: Surat, *Saldanha* 1827!

5. **Striga sulphurea** Dalz. ex Dalz. & Gibs. Bomb. Fl. 182, 1861; Hook. f. in Fl. Brit. Ind. 4:300, 1884; Cooke, Fl. Bomb. 2: 304, 1905; Santapau in Journ. Bomb. nat. Hist. Soc. 49: 44, 1950.

Occurrence: Very rare. Our specimens are from Katraj Ghat near Poona (*Saldanha* 1440-41).

NORTH KANARA: Yellapur, *Bell* 3114!

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